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**BART – SAN FRANCISCO AIRPORT EXTENSION
ALTERNATIVES ANALYSIS/DEIS**

DESCRIPTION OF ALTERNATIVES

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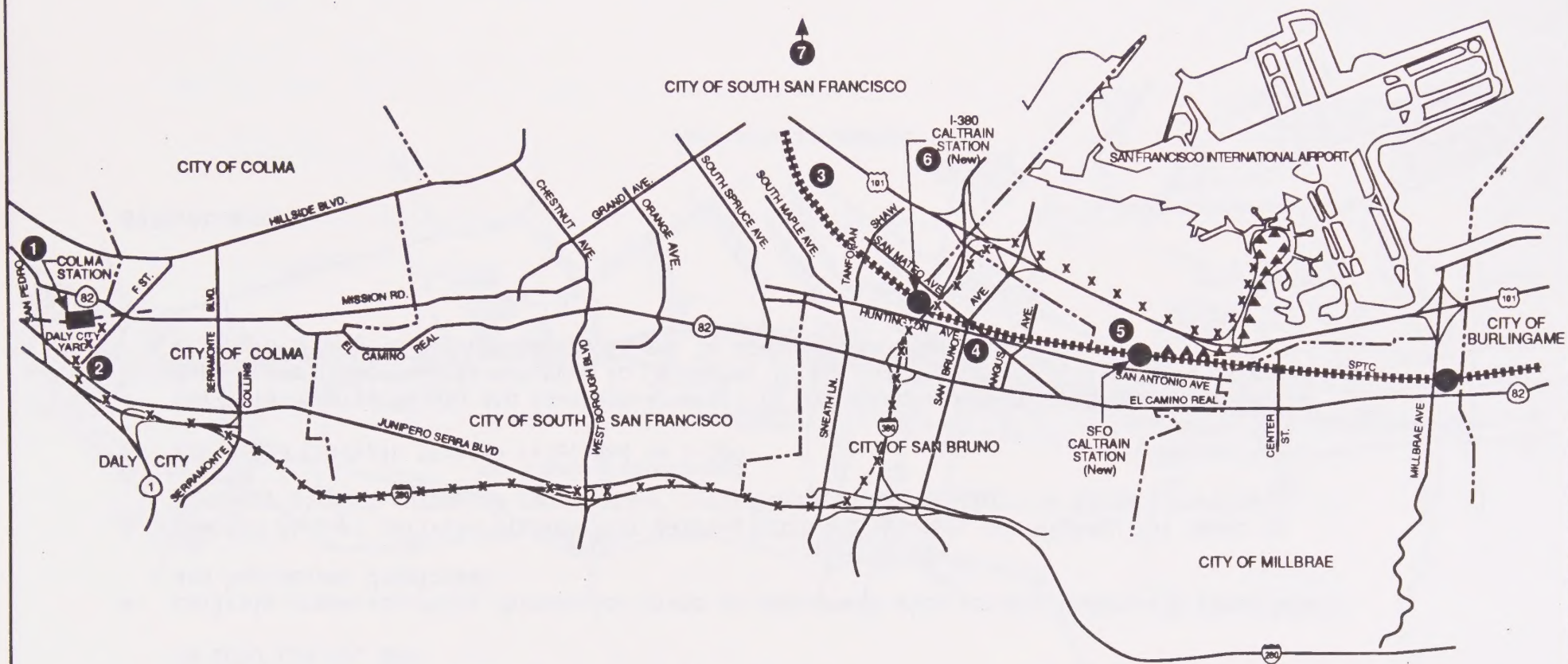
UNIVERSITY OF CALIFORNIA

October, 1991

"NO-BUILD" ALTERNATIVE

- Increased frequency of BART trains in the West Bay due to the new Daly City Turnback facility and other improvements currently being implemented;
- Extension of the MUNI Metro LRT J-Line to Stonestown Shopping Center;
- Widening of US 101 to eight lanes in southern San Mateo County;
- Maintenance of the existing CalTrain and SamTrans transit services; and
- Earthquake damaged freeways out of service.

TSM ALTERNATIVE 2



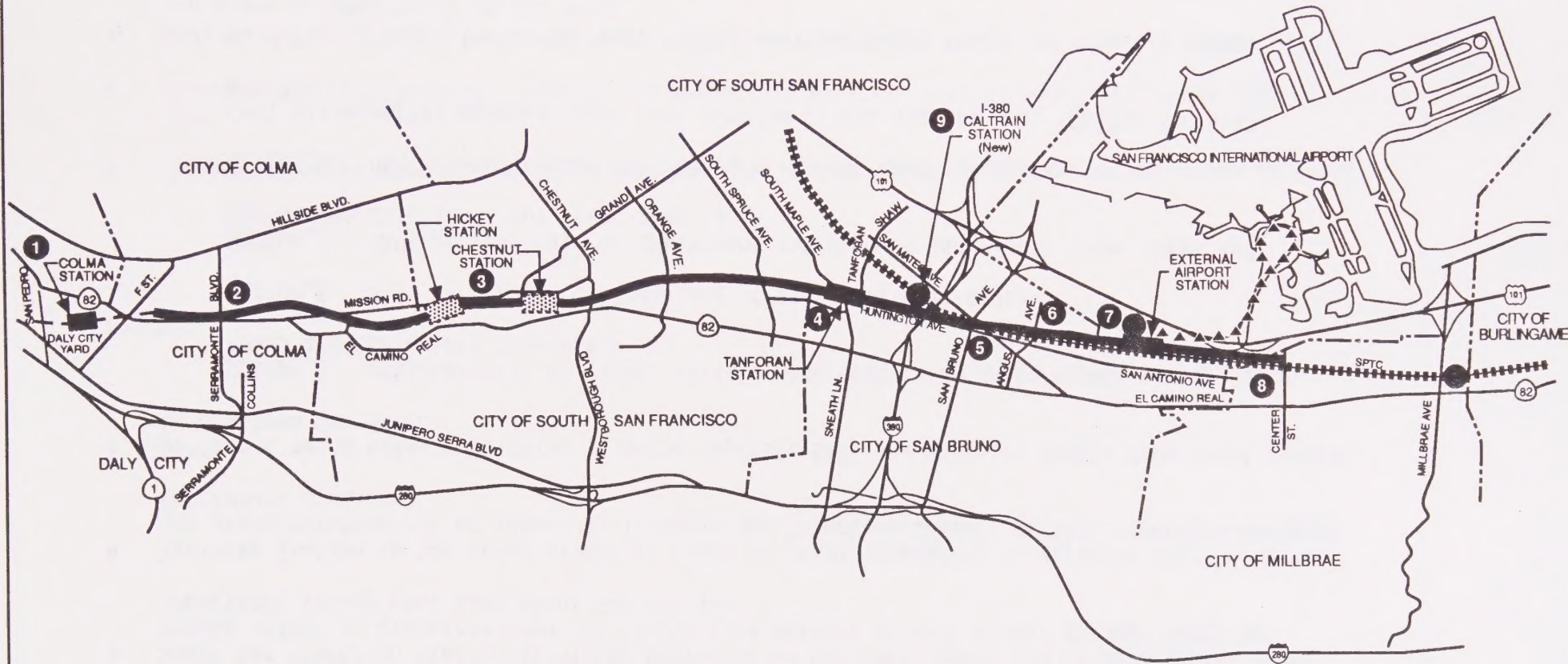
BART - SAN FRANCISCO AIRPORT EXTENSION
AA / DEIS / DEIR

| KEY | |
|---------|------------------------------|
| ● | CalTrain tracks and Stations |
| x x x x | SFO Shuttle Bus |
| ▲▲▲▲ | Airport people mover |
| 5 | see notes on back |

TSM 2A and 2B

1. Colma Station open in 1996; trains every 4.5 minutes during peak period in 2010; 32,000 BART trips begin or end at Colma Station in 2010.
2. SamTrans shuttle bus to SFO every 15 minutes; Shuttle bus carries 1400 to 5300 riders a day in 2010 (2B vs 2A).
3. CalTrain service increased to 86 trains per day and CalTrain carries 49,500 to 67,100 riders in 2010 (2A vs. 2B).
4. CalTrain grade-separated through San Bruno on embankment with streets underneath (some homes and businesses displaced).
5. New SFO Airport CalTrain station with parking (200-400 spaces), new Highway 101 ramps to station; airport automated people mover system between SFO Station and Airport terminals.
6. San Bruno CalTrain Station relocated to I-380.
7. CalTrain remains at 4th and Townsend Terminal in San Francisco with TSM Alternative 2A and Muni Metro light rail is extended to CalTrain; in TSM Alternative 2B, CalTrain is extended 1.5 miles in subway to 2nd and Market Street in downtown San Francisco.

ALTERNATIVE 3 SFO EXTERNAL STATION



BART – SAN FRANCISCO AIRPORT EXTENSION
AA / DEIS / DEIR

| KEY | |
|-----|--|
| | BART Tracks and Stations |
| | CalTrain Tracks and Stations |
| | Alternative South San Francisco Station Location |
| | Airport people mover |
| | see notes on back |

ALTERNATIVE 3

1. BART operates two TransBay routes beyond Colma to SFO; headways in 2010 are 4.5 minutes in peak period and 7.5 minutes off-peak.
2. BART is either retained cut or full subway through Colma; cost difference is \$16 million.
3. South San Francisco Station at Hickey Boulevard or Chestnut Avenue (to be determined); BART tracks either at grade/retained cut (least cost option) or full subway through South San Francisco; subway cost adds about \$49 million.
4. Tanforan Station in San Bruno either at grade or subway depending on verticle profile option (at grade/retained cut or subway as in South San Francisco above); parking structure designed for future expansion.
5. Different means being considered to grade separate BART and CalTrain tracks from local streets in downtown San Bruno:

Option A. BART/CalTrain at grade, streets underneath; San Mateo Avenue closed (some homes and businesses displaced)

Option B. BART in subway; CalTrain and streets remain as today.

Option C. BART and CalTrain on embankment and streets underneath (some homes and businesses displaced, but fewer than in "A").

Option D. BART over streets; CalTrain and streets remain as today.

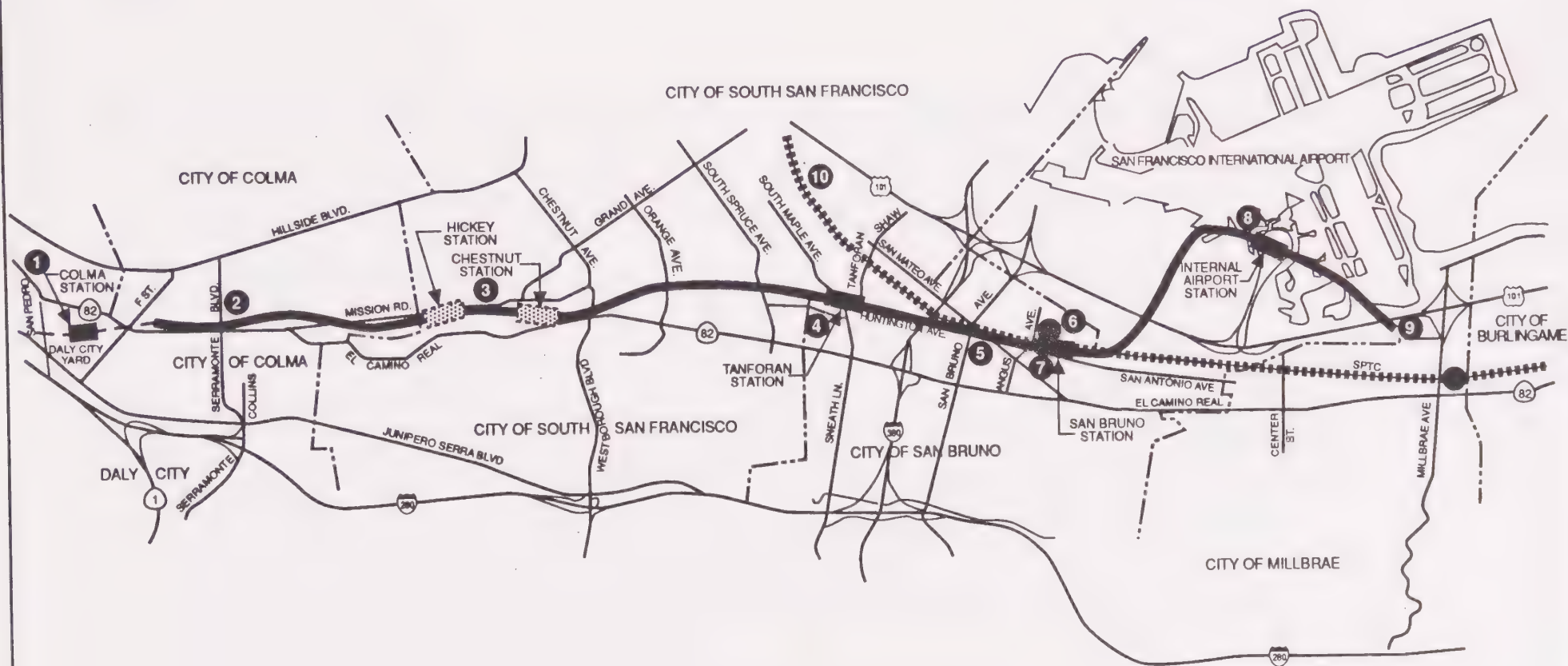
Cost differential between least cost (Option D) and highest cost (Option B) is \$71 million.

6. BART switches to east side of CalTrain tracks south of Angus Avenue to create a buffer with San Bruno neighborhoods on the west.
7. Joint BART/CalTrain SFO Station for transfers between systems and between airport people mover to terminals; people mover takes about 4 1/2 minutes to terminal; parking for 2325 cars; station access options from westside are:

1. Bus/car access from Center Street and pedestrian access from San Antonio Avenue,
 2. Bus-only access from Center Street and pedestrian access from San Antonio Avenue, and
 3. No access possible from west side, only from Highway 101.
-
8. Turnback and storage tracks extends .27 miles into Millbrae and car wash facility at end of line.
 9. CalTrain service same as TSM (86 trains per day) and San Bruno CalTrain Station moved to I-380.

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ALTERNATIVE 4 SFO INTERNAL STATION



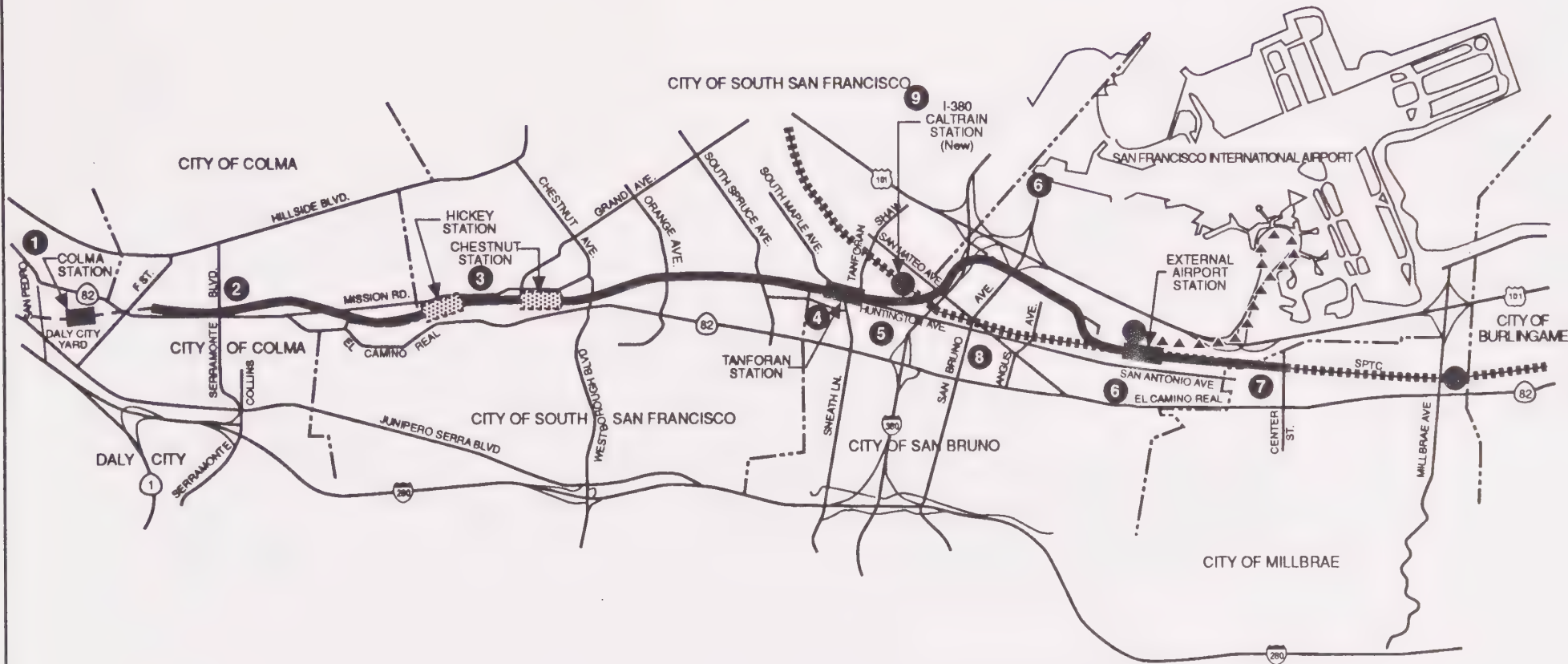
BART – SAN FRANCISCO AIRPORT EXTENSION
AA / DEIS / DEIR

| KEY | |
|-----|---|
| | BART Tracks and Stations |
| | CalTrain Tracks and Stations |
| | Alternative South San Francisco Station Locations |
| | see notes on back |

ALTERNATIVE 4

1. BART operating plan same as Alt 3; two TransBay routes continue to SFO.
2. Same vertical profile options for Colma as in Alt. 3.
3. Same station and vertical profile options for South San Francisco as in Alt. 3.
4. Same Tanforan Station issues as in Alt 3.
5. Same grade separation options for BART and CalTrain through downtown San Bruno as in Alt. 3.
6. San Bruno CalTrain Station relocated further north to provide a joint BART/CalTrain SFO Transfer station and to allow BART to swing east in subway under Highway 101 to internal airport station under Airport main garage; 2400 space parking structure on airport property with access from Highway 101 and Center Street; 600 foot walk from parking lot to BART/CalTrain platform; airport people mover does not serve this station since passengers transferring from CalTrain can take BART to terminal (airport employees have shuttle bus to other employment areas).
7. Limiting access to this station from west side (as requested by San Bruno) is more problematic.
8. SFO Internal Airport station is 50 feet below ground level; air passengers have 950 foot walk to ticketing counters in main terminal.
9. Turnback/storage track extends 5600 feet in subway beyond terminal platform; construction tunnel shaft for this tunnel would be on west side of Highway 101 and dirt would be removed though this shaft during construction and hauled away via the freeway.
- 10 CalTrain service same as TSM (86 trains per day), but there is no additional CalTrain Station under I-380 as in Alt. 3.

ALTERNATIVE 5 SFO EXTERNAL STATION VIA I-380



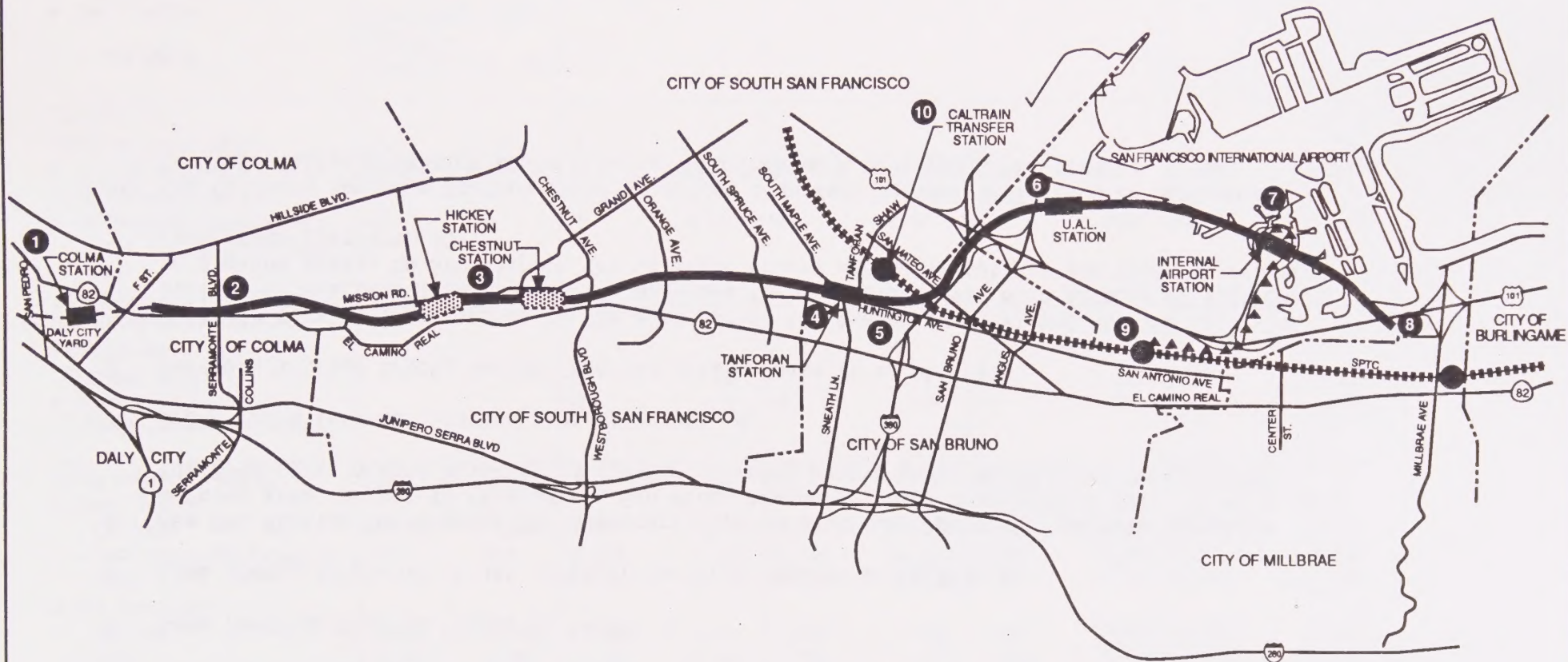
BART – SAN FRANCISCO AIRPORT EXTENSION
AA / DEIS / DEIR

| KEY | |
|-----|--|
| | BART Tracks and Stations |
| | CalTrain Tracks and Stations |
| | Alternative South San Francisco Station Location |
| | Airport people mover |
| | see notes on back |

ALTERNATIVE 5

1. BART operating plan same as Alt. 3; two TransBay routes continue to SFO.
2. Same vertical profile options for Colma as in Alt. 3.
3. Same station and vertical profile options for South San Francisco as in Alt. 3.
4. Same Tanforan Station issues as in Alt. 3.
5. BART descends in subway beyond Tanforan Station and uses I-380 corridor to bypass downtown San Bruno; BART swings under I-380 west of Highway 101 and passes to east of Belle Aire neighborhood in tunnel, and ascends to terminate at an at-grade BART/CalTrain SFO External Station as in Alt. 3; some homes and businesses displaced to enter tunnel south of Tanforan station; compared to Alt 3, travel times would be 45 seconds longer and construction costs would be \$85 million higher.
6. Same BART/CalTrain SFO External Stations location and access issues as Alt. 3.
7. Same turnback and storage track configuration as in Alt. 3.
8. CalTrain service increased as in TSM Alternative (86 trains per day); if CalTrain grade separated in future through San Bruno, some homes and businesses would be displaced.
9. New CalTrain station under I-380 as in Alt. 3.

ALTERNATIVE 6 SFO INTERNAL STATION VIA I-380



BART – SAN FRANCISCO AIRPORT EXTENSION
AA / DEIS / DEIR

| KEY | |
|-----|--|
| | BART Tracks and Stations |
| | CalTrain Tracks and Stations |
| | Alternative South San Francisco Station Location |
| | Airport people mover |
| | see notes on back |

ALTERNATIVE 6

1. BART operating plan same as Alt 3; two TransBay routes continue to SFO.
2. Same vertical profile options for Colma as in Alt. 3.
3. Same station and vertical profile options for South San Francisco as in Alt. 3.
4. Same Tanforan Station issues as in Alt 3.
5. Same subway alignment issues south of Tanforan Station as in Alt. 5.
6. New UAL Station for Highway 101 commuters located on Airport property, beneath long-term parking area; access to station via San Bruno Avenue off-ramp from Highway 101. Parking space for 2040 cars located adjacent to station; airport people mover would serve this station.
7. SFO Airport Internal Station same as in Alt. 4.
8. Turnback/storage tracks beyond Internal Station same as in Alt. 4.
9. CalTrain service increased as in TSM Alternative (86 trains per day) and new SFO CalTrain station with access from Highway 101 provided for CalTrain users; main purpose of station is to provide access to SFO Airport for CalTrain riders who would not use the Tanforan transfer connection (See Note 10).
- 10 New CalTrain Tanforan Station would be added; transfers between BART Tanforan Station and CalTrain Tanforan Station would require 1000 foot walk or shuttle bus ride.

SYSTEM IMPACTS OF ALTERNATIVES

| | 2A & 2B TSM | | 3A & 3B BART-SFO EXTERNAL | | 4A & 4B BART-SFO INTERNAL | | 5A & 5B BART-SFO EXTERNAL VIA I-380 | | 6A & 6B BART-SFO INTERNAL VIA I-380 | |
|--|---|------------|------------------------------|----------|------------------------------|----------|---|----------|---|----------|
| <u>ROUTE</u> | | | | | | | | | | |
| • Length (Colma-SFO) | N/A | | 6.1 mi | | 7.2 mi | | 6.4 mi | | 6.9 mi | |
| • New Stations | -Colma BART (2A,B) -CalTrain Downtown S.F. (2B) | | 3 | | 4 | | 3 | | 4 | |
| Capital Cost (Millions of \$ 1991) | <u>L</u> | <u>H</u> | <u>L</u> | <u>H</u> | <u>L</u> | <u>H</u> | <u>L</u> | <u>H</u> | <u>L</u> | <u>H</u> |
| • L - Least Cost | \$824(2A) | \$1448(2B) | \$627* | \$ 764* | \$1051* | \$1189* | \$712* | \$777* | \$1102* | \$1168* |
| • H - Highest Cost | | | | | | | | | | |
| • Difference Compared to least cost BART alignment (3L) | N/A | N/A | -0- | \$ 137 | \$424 | \$562 | \$85 | \$150 | \$475 | \$541 |
| *BART costs only (Colma-SFO) | | | | | | | | | | |
| Operating and Maintenance Costs-Annual (Millions of \$ 1991) | | | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> |
| • Difference compared to TSM 2A (A) or TSM 2B (B) | | | +17 | +15 | +21 | +19 | +17 | +15 | +15 | +15 |
| Daily Ridership (2010) | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> |
| • Total System | | | | | | | | | | |
| - CalTrain | 46,500 | 61,300 | 43,400 | 53,100 | 43,200 | 52,600 | 43,400 | 53,100 | 42,800 | 53,100 |
| - BART Colma-SFO Extension | N/A | N/A | 37,600 | 24,000 | 41,100 | 26,900 | 37,600 | 24,000 | 26,600 | 18,000 |
| - Total | | | 81,000 | 77,100 | 84,000 | 79,500 | 81,000 | 77,000 | 69,400 | 71,100 |
| • Air Passengers | | | | | | | | | | |
| - CalTrain | 3,100 | 4,000 | 3,300 | 4,000 | 3,000 | 3,800 | 3,300 | 4,000 | 3,300 | 4,000 |
| - BART | 3,100 | 3,000 | 7,300 | 7,100 | 7,700 | 7,500 | 7,300 | 7,100 | 7,700 | 7,500 |
| • "New" Transit Riders (Compared to TSM) | | | 10,800 | 9,600 | 10,100 | 8,700 | 10,800 | 9,600 | 9,800 | 8,300 |
| Transit Rider Travel Time Savings (Millions of \$ 1991) | N/A | | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> | <u>A</u> | <u>B</u> |
| | | | 8.5 | 5.0 | 7.6 | 4.5 | 8.1 | 4.7 | 7.1 | 4.3 |

NOTE: "A" Sub-alternatives assume CalTrain Terminal at 4th and Townsend, "B" Sub-alternatives assume CalTrain extended to 2nd and Market Street in San Francisco.



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